



Written Submission for the Pre-Budget Consultations in Advance of the 2024 Federal Budget

Investing in science will create new jobs and build a greener,
more competitive, more innovative, more inclusive, and more
resilient Canada.

By: The Canadian Association for Neuroscience

The Canadian Association for Neuroscience recommends the following:

Recommendation 1: That the government **double the budgets of the three main federal funding agencies:** Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) for the benefit of all Canadians. This recommendation aims to bring Canadian investment in scientific research to a level commensurate to that of other G7 countries.

Recommendation 2: That the government of Canada **increase support for graduate students and postdoctoral fellows** by increasing both the value and number of fellowships awarded in the next budget. We recommend that the government of Canada follow the recommendations of the House of Commons permanent committee on Science and Research:

- *Increase the value of Tri-Agency graduate scholarships and postdoctoral fellowships by 50%, and index them to inflation moving forward;*
- *Increase the number of Tri-Agency graduate student scholarships by 50%;*
- *Increase the number of Tri-Agency postdoctoral fellowships by 100%; and*
- *Increase the Tri-Agency research grant budget provided to faculty [...] to allow for increased graduate student and postdoctoral pay.*

In conjunction with Recommendation 1, this recommendation will ensure our next generation of scientists have the means to participate fully in Canada's knowledge economy.

Recommendation 3: That the government of Canada make **research on the Brain and Mental Health a national priority** by investing in research to understand the brain through well-established and trusted organizations in the field.



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Canadian scientists work for all Canadians. Their discoveries fuel the innovation economy, and their laboratories train highly qualified personnel who contribute to diversifying the Canadian workforce.

The International Monetary Fund published a detailed blog post explaining **Why Basic Science Matters for Economic Growth**.¹

“While applied research is important to bring innovations to market, basic research expands the knowledge base needed for breakthrough scientific progress. A striking example is the development of COVID-19 vaccines, which in addition to saving millions of lives has helped bring forward the reopening of many economies, potentially injecting trillions into the global economy. Like other major innovations, scientists drew on decades of accumulated knowledge in different fields to develop the mRNA vaccines.”

“Basic research is not tied to a particular product or country and can be combined in unpredictable ways and used in different fields. This means that it spreads more widely and remains relevant for a longer time than applied knowledge.”

Yet **Canada is falling behind in basic science funding when compared to other countries.**

Gross domestic spending on Research and Development as percentage of GDP

¹ <https://www.imf.org/en/Blogs/Articles/2021/10/06/blog-ch3-weo-why-basic-science-matters-for-economic-growth>

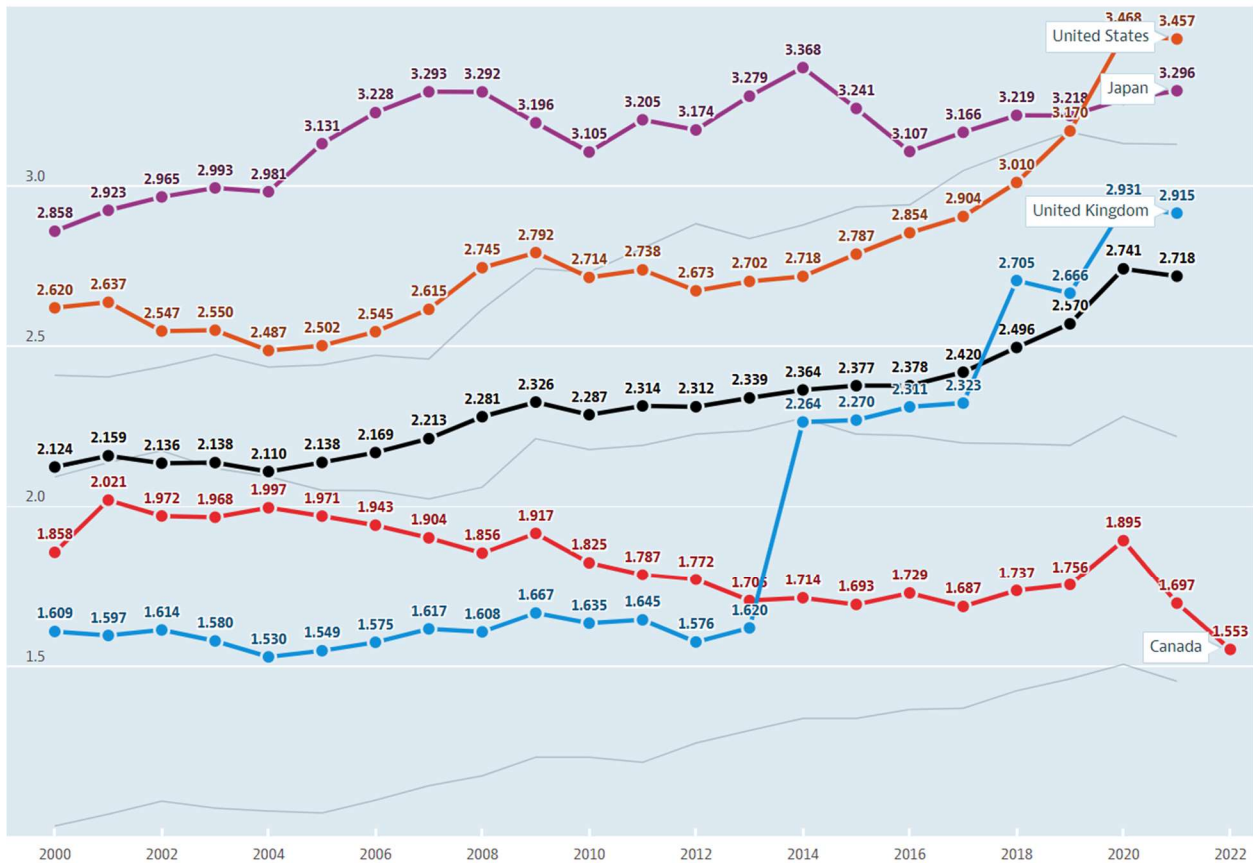


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data.oecd.org/chart/7kDF

Gross domestic spending on R&D Total, % of GDP, 2000 – 2022



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Compare countries on data.oecd.org 

Gross domestic spending on R&D is defined as the total expenditure (current and capital) on R&D carried out by all resident companies, research institutes, university and government laboratories, etc., in a country. Chart permanent URL: <https://data.oecd.org/chart/7kDF>

According to the latest data from the Organisation for Economic Co-operation and Development (OECD) **Canada is the only country** in the G7 whose investments in R&D have **steadily declined over the last 20 years, and even more steeply since the COVID-19 pandemic.**

Canada now ranks second to last among G7 countries in terms of gross domestic spending on R&D, with only 1.5% of its GDP invested in R&D. This comparatively low investment level places Canada below the average of 2.7% for OECD countries (black line in above chart) and well below the United States (3.5%), and other non-G7



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countries with fast-growing economies such as South Korea (4.8%) and Israel (5.4%) with respect to gross domestic spending in R&D.

We recognize that government investment in R&D is only a proportion of the total R&D investment in a country. However, research shows that government investment is multiplied by private investments, leading to a much higher return on investment. Many countries have recognized this, including Japan, Germany, and the United States. In March 2023, U.S. President Biden's budget included \$210 billion for federal R&D, the largest ever investment for federal R&D. The White House announcement stated:

The President's historic commitment to federal R&D investment is a recognition that American science, technology, and innovation—and the people that fuel it—are key to achieving our nation's great aspirations: ensuring robust health and plentiful economic opportunity for every person; tackling the climate crisis and transitioning to clean energy; investing in creating the industries of tomorrow; and advancing global security and stability.²

Canada has much to lose by not supporting its scientists. The competition is strong, and even if Canada's quality of life is enviable, high caliber researchers are attracted by the much higher financial means available to them in other countries.

It is time to reverse this trend and re-invest in Canadian Science.

If Canada does not increase its support for science, Canada will be behind the curve on innovation.

Canadians have much to gain from investment in science.

Addressing Brain and Mental Health issues, which are among the most complex to understand, but also the most important we face – the burden of brain disorders and diseases has substantially increased over the last 25 years with the aging of the population. Half of the world's population will be diagnosed with a brain disorder over the course of their lifetime. This is having a detrimental impact on the economy, healthcare systems, and Canadian livelihood. **Neurodegenerative diseases are the**

² <https://www.whitehouse.gov/ostp/news-updates/2023/03/13/fy24-budget-fact-sheet-rd-innovation/>



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leading cause of disability and the second leading cause of death worldwide³, and mental health disorders are the leading cause of days off work. Through their research, Canadian neuroscientists work tirelessly to identify cures and therapies for Canadians who live with these diseases and conditions.

Funding fundamental research can lead to lifesaving therapies. While most people recognize how fundamental research was key to the development of the COVID-19 vaccines, it is important to keep in mind that research performed in Canada has the potential to improve and save lives of individuals with many diseases. One very recent example, reported on CTV News⁴, showed how Canadian doctors performed the world-first delivery of treatment for an inoperable brain tumour in a child using ultrasound. This incredible feat was possible by **ground-breaking research done at the Sunnybrook Research Centre and the Sick Kids Hospital in Toronto using a novel focused ultrasound technology to deliver drugs across the blood-brain barrier**. Moreover, this innovative approach allows for drugs to specifically reach affected areas of the brain, offering hope for patients with inoperable, and often terminal, brain tumours.

Maintaining Canada's Competitiveness and Leadership in the World – Canada's scientists are some of the most respected on the world stage and for our nation we continually do well compared to others, however **this will not continue if we do not invest in research**. Canadian scientists are leaders in brain research including **autism, memory, sleep, pain, artificial intelligence, and spinal cord injury**. However, it is difficult for Canadian scientists to remain competitive and for Canada to attract new talent as the disparity in research support with other G7 countries continues to widen.

Creating Good Jobs for Canadians – Investing in scientific research leads to the creation of jobs for highly qualified personnel not just within research laboratories but across industry, government, and the health sector. Scientists trained in Canada play key roles in medical and high-tech companies in Canada, who are looking to fill competitive job opportunities.

³ Feigin et al. Lancet Neurol. 2019;18(5):459-480. doi:10.1016/S1474-4422(18)30499-X

⁴ <https://www.ctvnews.ca/health/canadian-doctors-perform-world-first-delivery-of-treatment-for-inoperable-brain-tumour-in-kid-using-ultrasound-1.6225776>



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Diversifying and Strengthening Canada's Economy – The world is moving towards a knowledge and innovation economy in which Canada has the potential to lead. **Made-in-Canada discoveries are the foundation for innovation** that supports a stronger and more diverse Canadian economy. Investments in health research leads to dramatic cost savings, due to more effective treatments, earlier intervention. For example, a recent report from the *World Economic Forum*, puts the costs of the neglect of women's health research at 1 Trillion dollars a year.⁵

We don't know where the next great discovery will come from, but we know that just like investment portfolios, diversity in investment breeds discovery and will increase return on investment.

A key to making Canada's workforce more inclusive: providing adequate funding for trainees.

The House of Commons permanent committee on Science and Research recently conducted an in-depth study of the **government of Canada's graduate scholarship and post-doctoral fellowship programs** and published a report on their findings. Their number one recommendation was:

That the Government of Canada, through the granting councils—the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada and the Canadian Institutes of Health Research:

- *Increase the value of Tri-Agency graduate scholarships and postdoctoral fellowships by 50%, and index them to inflation moving forward;*
- *Increase the number of Tri-Agency graduate student scholarships by 50%;*
- *Increase the number of Tri-Agency postdoctoral fellowships by 100%; and*
- *Increase the Tri-Agency research grant budget provided to faculty [...] to allow for increased graduate student and postdoctoral pay.*

⁵ <https://www.weforum.org/publications/closing-the-women-s-health-gap-a-1-trillion-opportunity-to-improve-lives-and-economies/>



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(Cited from [Report 8 - Government of Canada's Graduate Scholarship and Post-Doctoral Fellowship Programs](#) Presented to the House: Tuesday, December 12, 2023 by the House of Commons permanent committee on Science and Research)⁶

Even when the desire to stay in Canada is strong, our students are attracted by the much higher financial means available to them in the United States, Australia, the EU, and other countries. Indeed, **salaries for trainees** can be **triple** what is typically given at a Canadian university, making it financially sound to pursue an academic career outside of Canada.

Paying students a living wage is the base for equity, diversity and inclusion, and an essential requirement if we are to attract and retain the brightest minds from diverse backgrounds and not only those who are independently wealthy. **Diversity breeds discovery and innovation**, and the best way to promote diverse ideas and solutions for Canada's toughest problems in areas such as climate change, health, economics, neuroscience and beyond is to recruit from a diverse pool of applicants.

Decisive action is urgently needed. We recommend that funding for **Canada Graduate Scholarships and fellowships be increased in the next budget**, and that it be indexed to inflation. This investment would demonstrate the government's commitment to science and would allow Canada to retain its brightest minds and to attract new talent.

Now is the time to invest in a Canadian Brain Research Initiative

Canadian neuroscientists are world leaders in many fields of brain and mental health research. Recent examples can be found on the [Canada Brain Power website](https://canadabrainpower.com/). (<https://canadabrainpower.com/>). The development of a **national brain research strategy** would support collaborative, multidisciplinary and large-scale research programs that have the potential to lead to breakthroughs in our understanding and treatment of brain disease. The need for specific brain moonshot programs has been recognized by the European Union, the USA, Japan, China, South Korea, Australia, Finland, New Zealand, Latin America and Africa, which have all launched or are developing brain-themed national or international programs. The **Canadian Brain Research Strategy** (<https://canadianbrain.ca/>) has started to lay the groundwork for a Canadian Brain Initiative by bringing together researchers, patient partners and other key stakeholders to develop a model of open, collaborative, transdisciplinary

⁶ <https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/report-8/>



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and ethical brain research that reflects Canada's strengths. Canada has the potential to contribute and connect to international efforts, with the support of the Canadian government. Moonshot programs work for challenging diseases, and one need only to look at HIV/AIDS as an example. Over \$18B USD has been devoted to AIDS research over the years in the USA⁷, and this has led to advancements in therapeutics such that HIV infections are no longer a death sentence as individuals with HIV can live relatively full lives⁸. Knowing that brain disorders will inflict 50% of the population, are the leading cause of disability and contribute to the global burden of disease - it's hard not to get excited over the possibilities for healthier lives and economy if we invest in brain research.

Funding brain research is an investment in our health, our economy, and a better future for all Canadians.

Conclusion

Increasing the government's investment in R&D will be key to attracting emerging leaders in the field, keeping research in Canada strong, training the next generation of scientists and to supporting a knowledge-based economy that is prepared to face future challenges. Furthermore, brain diseases and disorders are amongst the most important challenges facing Canadians today.

We propose a bold, but timely and feasible plan for Canada:

- **Doubling the budgets** of all three Canadian science funding agencies – CIHR, NSERC, SSHRC
- **Increasing support** for Canada Graduate Scholarships and Post graduate fellowships
- **National prioritization of brain and mental health research** and increased investment in this field

⁷ <https://www.kff.org/hiv/aids/fact-sheet/u-s-federal-funding-for-hiv-aids-trends-over-time/>

⁸ Samji, H. et al. Closing the gap: increases in life expectancy among treated HIV-positive individuals in the United States and Canada. PLoS One 8, e81355 (2013).



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To avoid irreversible loss in coming years, support for science and research needs to grow. Invest for the future of our health. Invest in Canadians. The time for action is now.

About the Canadian Association for Neuroscience

We are the largest association of neuroscientists in Canada, with over 1000 members dedicated to advancing brain research.

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